

A NEW SPECIES OF *SIPHOCYPRAEA* (GASTROPODA, CYPRAEIDAE)
FROM THE NEOGENE OF SOUTHWEST FLORIDA

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ABSTRACT

A new fossil cowry, *Siphocypraea trippeana*, is described from the Buckingham Formation (early Pliocene; Petuch, 1987) in southwest Florida. The genus *Siphocypraea* (Miocene–Recent) is divided into three species-groups. *Siphocypraea hughesi* Olsson and Petit, and *S. transitoria* Olsson and Petit, both originally described as subspecies of *S. carolinensis* (Conrad), are elevated to species level.

INTRODUCTION

Intensive collecting carried out by Ms. Jay J. Tripp, Research Associate of Invertebrate Zoology (Carnegie Museum of Natural History), in the Newburn Mine, APAC Florida Inc. (Ashland Oil Inc.), Sarasota, Florida, during 1986–1987, produced a lot containing 24 gastropod specimens of the genus *Siphocypraea* that correspond to a new species described here. These, and many specimens of other extinct species of *Siphocypraea* collected by J. J. Tripp, are from the Buckingham Formation (early Pliocene).

The genus *Siphocypraea* Heilprin, 1887, ranged from North Carolina to southern Florida during the Miocene–Pliocene, although Recent species are restricted to the northern coast of South America. Extant species formerly placed in the *Cypraea mus* complex are now included in *Siphocypraea* (Petuch, 1979). Thus, *Siphocypraea* currently contains a number of species, and may be divided into three species-groups based on morphological features. The differences between these groups, however, are slight, and subgeneric separation is questionably justified. These groups are best considered under the concept of superspecies without taxonomic status. The genus *Cypraeacteon* White, from the Cretaceous–Paleocene of Brazil, was treated as a synonym of *Siphocypraea* by Wenz (1938). It has a shell more like *Marginella* than *Siphocypraea*, without labial or columellar teeth, and for these reasons it should not be included in the *Siphocypraea* grouping.

With *Cypraea mus* Linnaeus from the north coast of South America as type, Woodring (1957) established the subgenus *Muracypraea* within *Cypraea*; Olsson and Petit (1964) included it as a subgenus of *Siphocypraea*, while Petuch (1979) synonymized it under *Siphocypraea*. Gardner (1948) named a “section” *Akleistostoma* for species of the *Siphocypraea carolinensis* group, and this is here placed in synonymy. As Petuch (1979) indicated, the bulla stages of *S. mus* and *S. henekeni* Sowerby are similar to adult specimens of *Siphocypraea* in having a crater-like umbonal feature, supporting a congeneric grouping. This feature, inferred to be primitive, suggests that early fossil *Siphocypraea* are similar to the ancestral stock of the entire lineage.

SPECIES GROUPS

Three species groups are recognized on the basis of the following characters:

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- I. Adult state with apex having a crater-like depression. Aperture narrow and very regular, posterior canal very deep and circular with a comma-shaped sulcus; smaller fossula.

S. problematica Heilprin, 1887 (type of *Siphocypraea*)

S. lindae (Petuch, 1986)

S. trippeana n. sp.

- II. Adult state with apex having a crater-like depression. Aperture wider, irregular, almost circular at the anterior portion where the columellar and labial sides are concave. Posterior canal more elongated; comma-shaped sulcus less curved; larger fossula.

S. carolinensis (Conrad, 1841)

S. carolinensis floridana Mansfield, 1931

S. transitoria Olsson and Petit, 1964, new status

S. hughesi Olsson and Petit, 1964, new status

S. pilsbryi (Ingram, 1939)

S. chilona (Dall, 1900)

- III. Adult stage with regular *Cypraea*-like apex; aperture variable.

Recent: *S. mus* (Linnaeus, 1758)

Recent and Pleistocene:

S. henekeni (Sowerby, 1850) [Not *henekeni* as cited by Weisboard (1962), a misidentification of *S. donmoorei* Petuch]

S. donmoorei Petuch, 1979

SYSTEMATICS

Siphocypraea trippeana Parodiz, new species

Fig. 1, 5, 9, 11

Description.—Shell elongate, width slightly less than half the length; semiovate, narrowed anteriorly, wider than high. Dorsum very convex, smooth. Base flattened anteriorly. Margin without regular pitting, outer area of lip faintly marked by projections of teeth. Callus thick in rostral view, but angulated on portion that turns over dorsum at anterior end; regularly curved from middle to posterior end, showing some weak undulations. Line separates callus from dorsum. Anterior canal projecting to right in opposite direction of apical notch. Edge of anterior canal forms sharp terminal ridge oblique to first columellar tooth; between these features is wide depressed area that enhances sharpness of ridge, flattened at ends below ridge. Similar but smaller flat area on opposite (labial) side, which has no ridge. Small fossula only visible in oblique view, as is inconspicuous columellar sulcus described above. Crater or pit of sunken apex keyhole-shaped, continuing from posterior deep canal, narrow below and widely projected to right above (posterior view), with portion corresponding to extension of outer lip semilunar; viewed dorsally, notch much wider than in related species; posterior opening covered by curved end of lip with margination around keyhole edge which thickens toward columellar side. Width of aperture constant from anterior to posterior end. Eighteen teeth on columellar side; anteriormost tooth forms angle with terminal ridge between which is depressed area; teeth regularly spaced anteriorly, irregular and uneven toward posterior end. Twenty-two labial teeth, very regular and well separated at middle, but closer and sharper near anterior canal; fourth labial tooth is at level of first columellar tooth. Teeth near posterior notch smaller. Shell solid, heavier than specimens of comparable size in other species.

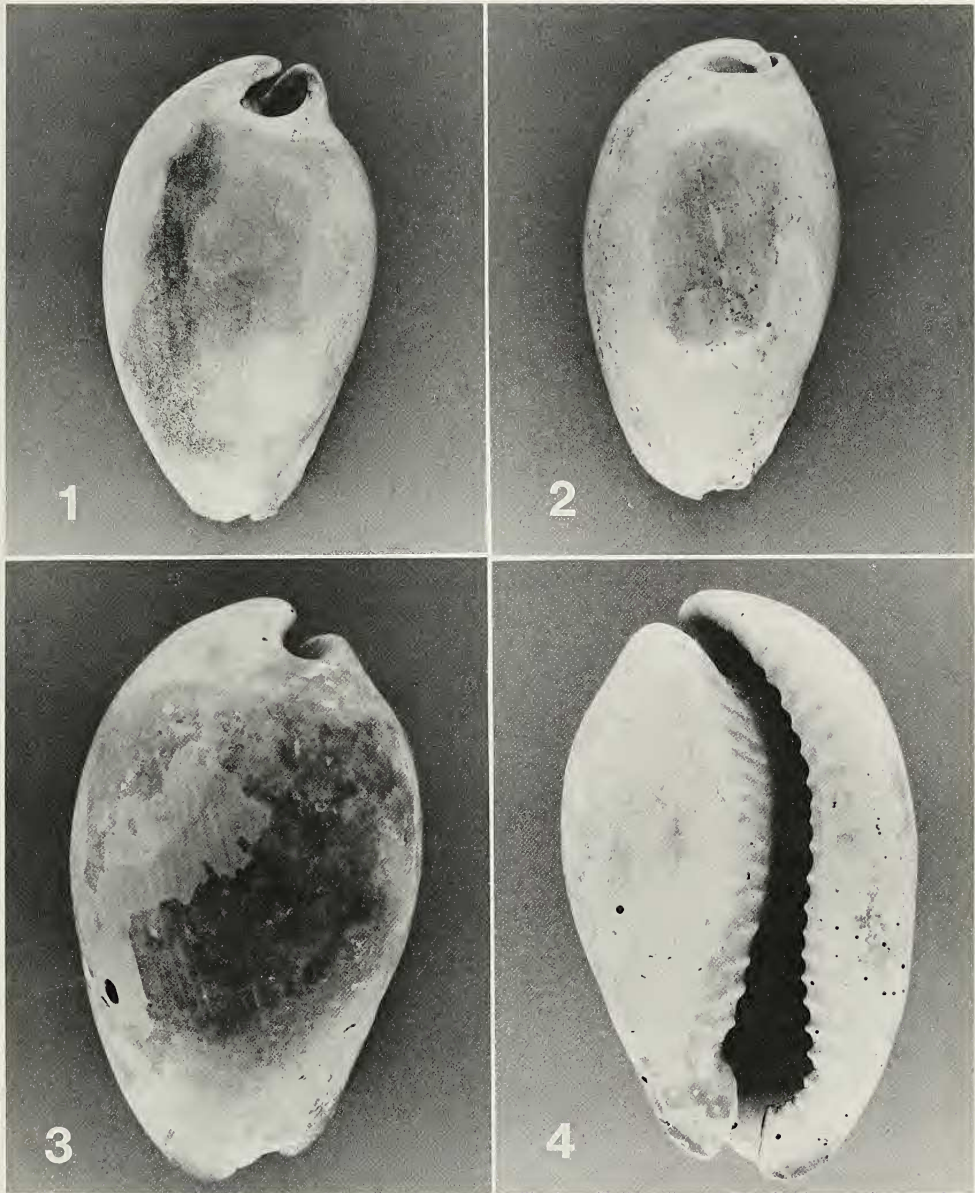


Fig. 1-4.—*Siphocypraea* species. 1. Dorsal view of *Siphocypraea trippeana* (Holotype, CM No. 42199. Length, 55.8 mm). 2. Dorsal view of *S. problematica* (CM No. 43575. South bank of Caloosahatchee River, La Belle, Florida; coll. K.K. Shaw (1966). Length, 60 mm). 3. Dorsal view of *S. carolinensis floridana* (CM; Florida. Length, 76 mm). 4. Ventral view of *S. carolinensis floridana* (Same specimen as Fig. 3).

Dimensions (in mm).—Holotype (specimen No. 9 in lot, Carnegie Museum No. 42199). Length (L), 55.8; diameter (D), 32.2; height (H), 26.8; width of aperture, 3; width of anterior canal at middle, 2.5; depth of apical notch, 9; apical notch at widest dorsal point, 8.5.

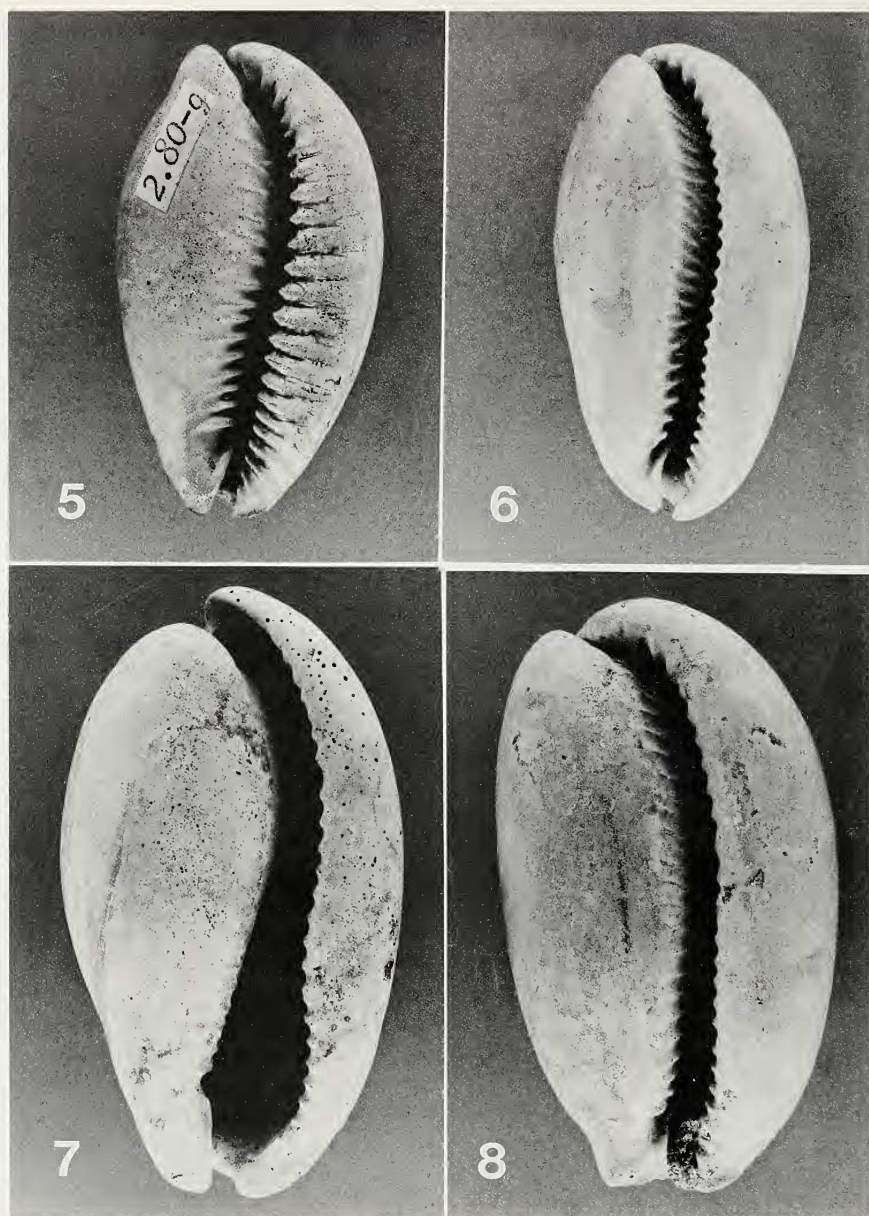


Fig. 5-8.—Ventral view of *Siphocypraea* species. 5. *Siphocypraea trippeana* (Holotype, CM No. 42199. Length, 55.8 mm). 6. *S. problematica* (CM No. 43575, same specimen as Fig. 2). 7. *S. carolinensis floridana* (CM No. 47179. Newburn Pit Mine, Sarasota, Florida; coll. J. J. Tripp (1983). Length, 89 mm). 8. Gerontic specimen of *S. problematica* (CM No. 43540. Banks of Lake Okeechobee, Florida; coll. E. Maratt (1960). Length, 78 mm).

Paratypes. 21 (18 perfectly preserved; 3 with fractured dorsum). The mean of all specimens measured is: L, 53.9; D, 30.7; H, 24.6; labial teeth, 20; columellar teeth 18-22. Ratios: L/D 1.73; L/H 2.19; D/H 1.24.

Variation.—In the type lot, specimens shorter than the type are narrower, the

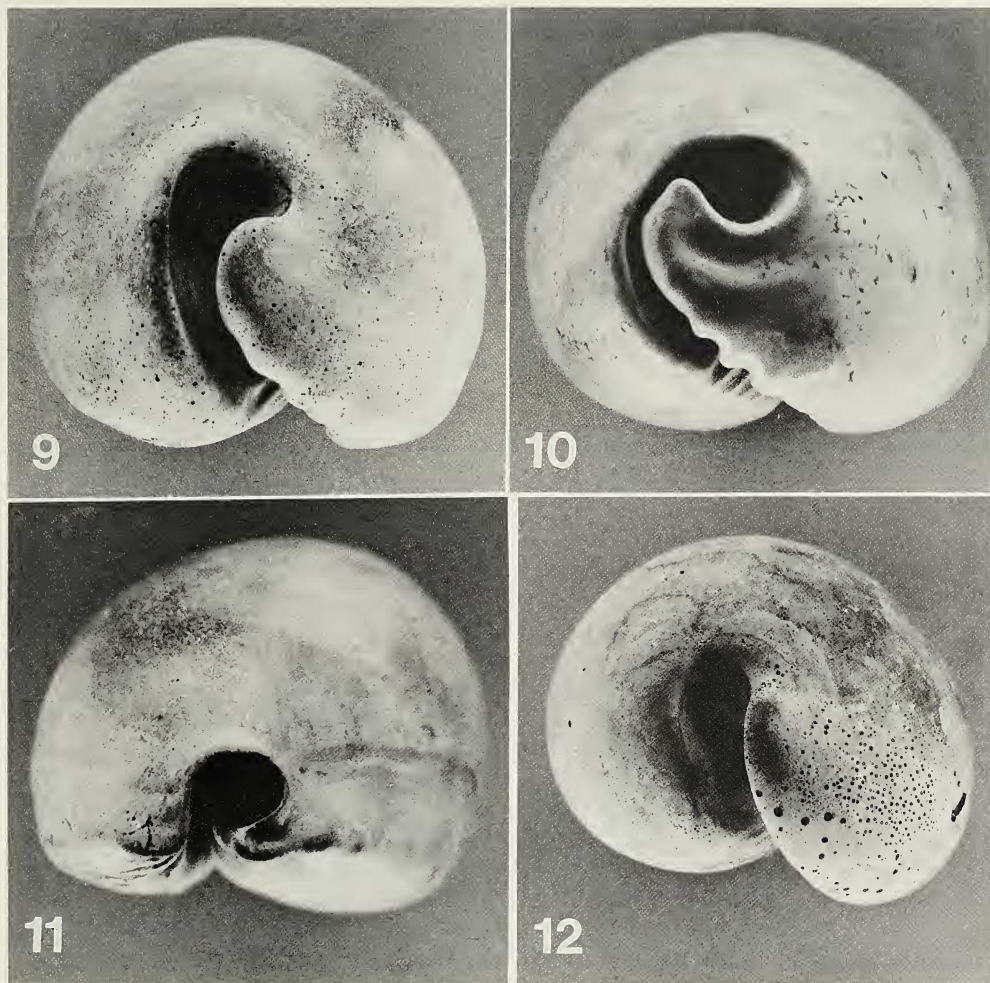


Fig. 9–12.—Anterior and posterior views of *Siphocypraea* species. 9. Posterior (apical) view of *Siphocypraea trippeana* (Holotype, CM No. 42199. Width, 32.2 mm). 10. Posterior view of *S. problematica* (CM No. 43575, same specimen as Fig. 2. Width, 34 mm). 11. Anterior view of *S. trippeana* (Holotype, CM No. 42199. Width, 32.2 mm). 12. Posterior view of *S. carolinensis floridana* (CM No. 47179, same specimen as Fig. 7. Width, 50 mm).

width increasing in larger specimens in greater proportion than the length. The number of labial and columellar teeth varies from 18 to 26, and 15 to 22, respectively, and in some cases the number of teeth increases proportional to the size of the shell, but there are also some large specimens with less teeth than average. The height increases according to the length of the shell but gerontic specimens are relatively higher.

Type locality.—Newburn Mine, APAC Florida Inc. (Ashland Oil Inc.), D.O.T. 17-087, in Buckingham Formation (Mansfield, 1939), early Pliocene (Petuch, 1987), Sarasota, Florida.

DIAGNOSTIC COMPARISONS

The species most similar to *S. trippeana* is *S. problematica*, the type of *Siphocypraea*. Both species are of comparable size, but normal adults of *S. problematica* are larger, particularly gerontic specimens (Fig. 8). In *S. problematica*, the anterior ridge is sharper and consequently the area between it and the first columellar tooth is more depressed. In *S. trippeana*, the apical opening is more of a keyhole shape (Fig. 9), not circular as in *S. problematica* (Fig. 10), and in dorsal view not as flat. Due to its shape, the opening extends over the dorsum more in *S. trippeana* where it is more visible than in *S. problematica* (Fig. 1, 2). Also, the comma-shaped sulcus characteristic of *S. problematica* is less rounded or curved in the new species, and the projecting lobe wider distally. The aperture in both species is of constant width, a character that distinguishes them from the *S. carolinensis* group (Fig. 4–8).

In *S. carolinensis* and *S. carolinensis floridana*, the aperture widens considerably at the anterior end, forming a circular opening and the sides of the aperture are relatively parallel only at the posterior end (Fig. 12). *Siphocypraea carolinensis* also has larger anterior and posterior canals. The shell is wider in *S. carolinensis* (Fig. 3) than in *S. trippeana*. Specimens of *S. carolinensis* and *S. carolinensis floridana* have larger shells than *S. trippeana* specimens of similar age, and their shells are thinner and lighter than the strong shells of *S. trippeana*. These differences can be found also between the new species and *S. transitoria*, in which the sulcus is narrower and curved.

From *S. hughesi* the differences are still more obvious: *S. hughesi* is the most rounded of all the species, with the aperture more curved at the ends, and larger in size but with a smaller lobular projection on the sulcus.

Siphocypraea carolinensis floridana, and other forms described originally as subspecies, *S. carolinensis hughesi* and *S. carolinensis transitoria*, are—as well as *S. trippeana*—from the Buckingham Formation. The type localities of *S. hughesi* and *S. transitoria* are the same (five miles east of Brighton, Highlands County, Florida). The latter two forms are sympatric and synchronic, and subspecific status is inappropriate since no more than one subspecies can inhabit the same area. Therefore, in view of their differences, they should be considered as separate species, *Siphocypraea hughesi* Olsson and Petit, and *Siphocypraea transitoria* Olsson and Petit.

I have observed the following additional specimens of *S. problematica* and *S. carolinensis*, which are gerontic and unusually large:

Siphocypraea problematica.—Banks of Lake Okeechobee. Coll. E. Maratt (1960), CM No. 43540 (Fig. 8). 78 × 46 mm and as high as wide. Shell very thick and heavy.

Siphocypraea carolinensis floridana.—Newburn Pit Mine, Sarasota, Florida. Coll. J. J. Tripp (1983), CM No. 47179 (Fig. 7, 12). 89 × 50 mm; aperture at anterior end is 20 mm wide. Labial teeth 23. Although it is a larger specimen than the *S. problematica* from Okeechobee, the shell is considerably thinner and lighter.

Other observed specimens of *S. problematica* are:

CM No. 43575. South bank of Caloosahatchee River, La Belle, Florida. Coll. K. K. Shaw (1966) (Fig. 2, 6, 10). Three specimens of medium size, beautifully preserved, still having the glaze on dorsum and on the ventral side. Labial teeth 27, columellar 23. Anterior ridge very sharp.

CM No. 46851. Caloosahatchee Formation, on route 80, west of La Belle, Florida. Coll. J. J. Tripp (1981).

CM No. 47200. Coll. J. J. Tripp (1987). Found together with *S. trippeana*; numerous specimens.

DISCUSSION

A recently described species, *Cypraea lindae* Petuch, 1986, from the Buckingham Formation at Miami, also belongs to the *S. problematica* group by virtue of its characteristic straight aperture (Fig. 6). It differs from *S. problematica* as well as from *S. trippeana* by the very strong and more separated labial teeth, and the very coarse dentition on the columellar lip. The posterior notch is smaller than in *S. trippeana*; the shell is also smaller in size but wider than *S. trippeana*, and has a higher hump.

Siphocypraea donmoorei Petuch, 1979, from Panama to the coasts of Colombia and Venezuela, appears as a living and intermediate lineage between the typical *Siphocypraea* of the Florida Miocene-Pliocene and those of the *S. mus* group.

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